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Artificial Intelligence in Patient Care in Riyadh, Saudi Arabia 2019-2020

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ABSTRACT

Background: Artificial intelligence is a field of computer science that is capable of analyzing complex medical data. *Objectives*: To describe the awareness and Perception of uses of artificial intelligence among providers in Medical health care settings. *Methodology*: Data was collected by a questionnaire filled by health care physicians in king Khaled University Hospital and King Saud Medical City in Riyadh. *Results*: Out of 105 participants, about 58% of those physicians were either denied access to AI or AI was not available in the facility where they work. Access to artificial intelligence was not statistically different among the three professional groups. About 51% of those physicians rarely or never use AI. Out of 105 (64%) of the doctors chose excellent to the relationship between acquaintance and attitudes towards the AI. (16%) of the physicians chose moderate and finally (20%) of them chose poor. *Conclusion*: There's no significant difference in the attitude and acquaintance of physicians towards Artificial intelligence in relation to their gender, categories or years of experience. Although most physicians have good acquaintance and attitude towards Artificial intelligence, unfortunately there's no proper accessibility to AI.

Keywords: Artificial Intelligence, Physicians, Attitude, Awareness

1. INTRODUCTION

Artificial intelligence, an area of computer, highlights the formation of intelligent devices and is capable of analyzing complex medical data. Their potential to exploit meaningful relationships in a data set can be used in the diagnosing, treating and predicting outcomes in many clinical scenarios. It uses in a lot of different branches of Medicine (Ramesh et al., 2004). Long term complications of artificial medical devices are rare but important. Many of the potential long term complications of artificial intelligence such as translaryngeal intubation and tracheotomy are much the same (Camarillo et al., 2004). Although most patients undergoing these operations tolerate them

without challenges, complications are possible. Understanding these potential difficulties will help preventing them (Suter et al., 2011).

The benefits from this research are to know the physician knowledge and experience of technologies, and how they use it for solving medical problems and reducing medical mistakes. One of the top technologies in medicine is artificial intelligence the artificial intelligence helping the physicians to take the right decision in short time. This research shows the technology boom and how the doctors and medical students adapt with it, sopersonal interviews are undertaken to understand the awareness and acceptance of the artificial intelligence (Ramesh et al., 2004). This study hypothesis there will be equal level of awareness between categories of physicians regarding artificial intelligence but they might be different in attitudes towards it. The aim of the research is to describe the attitude and practice of artificial intelligence among physicians in patients care settings in Riyadh, Saudi Arabia.

2. METHOD

This study is a cross sectional study. The study area was in King Khaled University hospital and King Saud Medical City. The duration of this study was 10 months from September 2019 to June 2020. The study population was health care providers and physicians in the hospital(male and female and Saudi and non-Saudi). The data was distributed and collected to (105) physicians in King Khaled University Hospital and King Saud Medical City in Riyadh. Participants were chosen by quota sampling technique. The data was collected by a printed questionnaire and distributed to health care physicians in king Khaled University Hospital and King Saud Medical City in Riyadh, this questionnaire was specially designed for this study. It was constructed in 3 sections, the first one was basic information, second was about the awareness, and the third was the physicians' attitude toward Artificial intelligence. This questionnaire was in English. If 7 questions or more were answered positivelythen the physicians' attitude will be considered positive, If 5 questions are answered positively then the physician's attitude will be considered moderate, if its less than 7 questions the physician has a negative attitude towards AI. The collection of data was collected by the research conductors: developing a questionnaire that was distributed to health care providers in hospitals, they answered until we attained an appropriate response rate. We analyzed after we collected it back after a short period of distribution. The data was cleaned, coded and entered by using PSPP software. The upcoming step afterward was to present the data in tables and graphs as shown in dummy tables. Finally, a suitable statistical test was used to decide on associations as shown in the dummy table. The permission was taken from the participant physicians by asking them to participate by answering the questionnaire. Data was used only for the purpose of the research and the confidentiality and privacy will be maintained. The participants have the right to withdraw from the study at any time.

3. RESULTS

The table 1 shows relationship between the job title and accessibility to artifi- cial intelligence. The residents comprise 52%, the registrars were 21%, con- sultants 27%. About 58% of those physicians were either denied access to AI or AI was not available in the facility where they work. Access to artificial intelligence was not statistically different among the three professional groups (Table 1 and Figure 1).

Table 1 The comparison between the different categories of physicians and their accessibility to AI (Artificial intelligence in patient care in Riyadh, Saudi Arabia 2019-2020

Job title/ accessibility	Readily accessible	Restricted	Not accessible	Not available	Total
Resident	17	7	13	18	55
Registrar	6	3	4	9	22
Consultant	8	3	4	13	28
Total	31	13	21	40	105

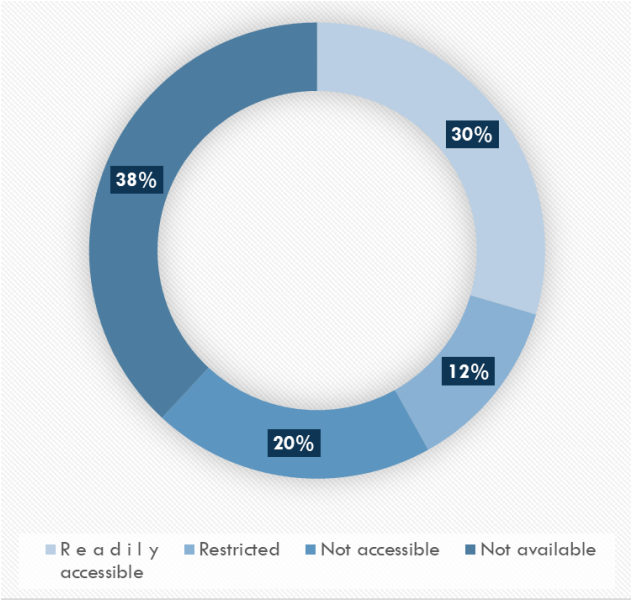

Figure 1 Relationship between the Job Title and the accessibility to AI among the physicians

The table 2 shows the relationship between the job titles and how often the physicians use Artificial Intelligence. The residents compromise 52%, the registrars were 21%, consultants 27%. About 51% of those physicians rarely or never use AI. The usage of AI was not statistically different among the three professional groups (Table 2 and Figure 2).

Table 2 The comparison between how often the physicians use Artificial Intelligence and their different categories, King Khaled University Hospital and King Saud Medical City-Riyadh (Artificial intelligence in patient care in Riyadh, Saudi Arabia 2019-2020)

Usage/Job title	Daily	Weekly	Yearly	Rarely	Never	Total
Resident	10	9	4	10	22	55
Registrar	5	5	2	4	6	22
Consultant	6	8	2	3	9	28
Total	21	22	8	17	37	105

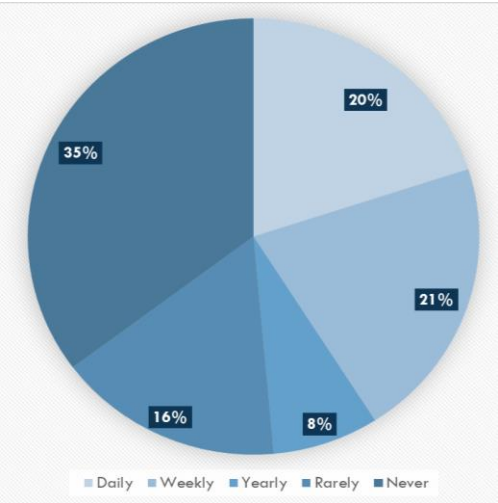

Figure 2 The comparison between how often the physicians use Artificial Intelligence and their Different categories

It shows out of 105 sample size as 16% of the doctors had an excellent relation be- tween the usage and acquaintance towards A.I. 19% of the physicians chose very well, 34% had a good relation and finally 31% had a poor relation. Although there was 24% of physicians that used artificial intelligence for diagnostic purposes and only 10% used it for therapeutic usage (Table 3 and Figure 3).

Table 3 The comparison between the usage and Acquaintance of physicians with AI, King Khaled University Hospital and King Saud Medical City-Riyadh (Artificial intelligence in patient care in Riyadh, Saudi Arabia 2019-2020)

Usage/ Acquaintance	Excellent	Very good	Good	Poor	Total
Therapeutic	2	4	4	1	11
Diagnostic	1	5	10	9	25
Both	14	11	22	22	69
Total	17	20	36	32	105

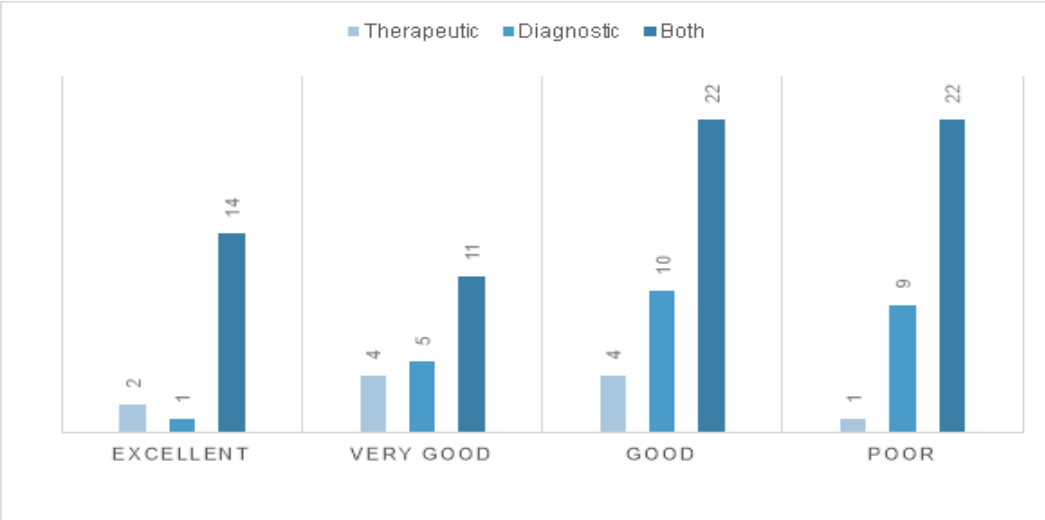

Figure 3 The comparison between the usage and Acquaintance of physicians with AI

Table 4 shows that out of 105 (64%) of the doctors chose excellent to the relationship between acquaintance and attitudes towards the AI. (16%) of the physicians chose moderate and finally (20%) of them chose poor (Table 4 and Figure 4).

Figure 4 The comparison between the Acquaintance and Attitude of Physicians towards AI

Table 4 The comparison between the Acquaintance and Attitude of Physicians towards AI, King Khaled University Hospital and King Saud Medical City- Riyadh (Artificial intelligence in patient care in Riyadh, Saudi Arabia 2019-2020)

Acquaintance/ Attitude	Excellent	Moderate	Poor	Total
Excellent	15	1	1	17
Very good	15	1	4	20
Good	23	5	8	36
Poor	14	11	7	32
Total	67	17	20	105

4. DISCUSSION

The finding that more than half of the physicians had no access to AI was unexpected and unacceptable. It was thought that physicians will be required to use AI for the better of the patient. It is reported in literature that AI use improved the excellence of patient care (Neuhauser et al., 2013). The absence of statistical difference among the different categories of physicians in their access to AI shows that they are equally willing to use it if it becomes available. This finding of high inaccessibility to AI should be verified and reported in other facilities. If it tends to be true, authorities should be alerted. The finding is that greater than half of the physicians rarely or never use AI which is unexpected and unacceptable. It was thought that physicians will use AI for the patients' advantage (Chau & Jenhwa, 2002). There's an absence of statistical differences among the different categories of physicians which shows that the physicians' job title doesn't affect their use of AI. Findings of this study were unexpected; there was magnificent low percentage of physicians that had an excellent relation between the usage and acquaintance towards AI. The results above show that physicians in Riyadh do not rely on AI for their diagnosis or treatment. In the near future awareness and conferences should be held to help increase the usage and acquaintance towards AI, as it would be extremely helpful to introduce it in the field of medicine in KSA to save time and decrease the load of work on doctors as well as to increase efficiency of medical work in therapy and diagnosis and decrease the human error. Using AI in therapy and diagnosis doesn't cancel or delete the effect of physicians but improves their results during diagnosis and surgical operations. In conclusion the result shows that most of the doctors had an excellent relationship between acquaintance and attitude towards AI and few of them had poor relationship towards AI.

5. CONCLUSION

In conclusion, there's no significant difference in the attitude and acquaintance of physicians towards Artificial intelligence in relation to their gender, categories or years of experience. Although most physicians have good acquaintance and attitude towards Artificial intelligence, unfortunately there's no proper accessibility to AI. Most of the doctors had an excellent relationship between acquaintance and attitude towards AI. And few of them had poor relationship towards AI.

Recommendations

Courses should be done by the SCFHS to physicians from all specialties to spread more awareness to Artificial Intelligence.
All physicians should be allowed access to Artificial Intelligence for the advantage of the patients
The high inaccessibility to AI should be verified and reported in other facilities. If it tends to be true, authorities should be alerted.

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Author Contributions

Under supervision and guidance of Dr. Mona A Alfadeel and leadership of Medical student, Nouf A Khalifah, authors Nouf A Khalifah, Hotoon S Al Shammari, Fatema S Smaisem, Haya A Al Qahtani, Asmaa K Al Otaibi, Reham M Al Shehri, Farah A Qari, Rayan M Seedahmed, Hanaa M Abutaima and Raghad A Al Ameer all participated equally in Proposal writing, literature review writing, Introduction writing, Questionnaire writing, Manuscript (abstract) writing, Discussion and conclusion writing.

Ethical approval

This study was approved by the Local Research and Ethics Committee board of AlMaarefa University (ethical approval code: 4/201).

Conflicts of interest

The authors declare that they have no conflict of interest.

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This study has not received any external funding.

Data and materials availability

All data associated with this study are present in the paper.

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